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Vegetable Variety and Strain Trials

1933-34



EARLY CABBAGE VARIETY TRIALS - 1934

THE PENNSYLVANIA STATE COLLEGE
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION
STATE COLLEGE, PENNSYLVANIA

Vegetable Variety and Strain Trials

1933-34¹

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TESTS are conducted by the Pennsylvania Agricultural Experiment Station from year to year to discover the characteristics and merits of new varieties and strains, to acquaint vegetable growers with the relative merits of different commercial strains of certain varieties, each of which may be suited for particular requirements, and to inform seed breeders and distributors of the adaptability of their varieties and strains to climatic and soil conditions similar to those prevailing at State College. In these tests, emphasis has been placed on the kinds of vegetables which are produced in considerable quantities in Pennsylvania market, truck, and home gardens, and on those varieties and their strains which already have been found to have desirable characteristics for vegetable growers in this state.

Limitations of Variety Trials

The results of variety trials should be applied by growers with certain reservations, because vegetable varieties are not uniformly affected by different climatic and soil conditions. New strains, therefore, should be compared with those already in use in a particular locality, or for a given market, before being grown commercially. Retail seedsmen may discontinue one strain and substitute another, without apprising their customers that changes have been made; hence results with seed from a retail seedsman cannot be relied upon to be duplicated in another season even if the same variety is ordered from the same seedsman. Vegetable growers, when purchasing seed of a variety which appeared desirable in trials, should be explicit in demanding *seed of the same stock as that used in the trials*. Furthermore, stocks are subject to change, even in the hands of careful breeders, because plant selections must be made annually. The changes which occur in this way are small, however; with skillful breeders they are more likely to be to the growers' advantage than otherwise. In view of these considerations, it is recommended that vegetable growers give special attention to strains or stocks which carry designations or numbers by which they may be identified by retail seedsmen and growers.

Yield records are of small significance in variety trials because of the small area of the plots and the small number of replications which are possible when a large number of kinds, varieties, and strains are compared. Where yields are tabulated, differences should not be considered significant unless they are 25 per cent or more of the mean yield of the two varieties compared. Differences in early yields or in yields of a certain grade should be greater than one-third of the mean of the two varieties, to be considered significant.

The time from planting to maturity is influenced considerably by

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rainfall and temperature; hence attention should be paid to these conditions with reference to the normal when the number of days from planting to maturity is compared, for different varieties, strains, and kinds.

*Weather Conditions
in 1933 and 1934*

In order to make it possible to relate yield, length of time for maturity, and other characteristics of varieties to the climatic conditions prevailing, the mean temperature and rainfall for each week of the growing season are reported in Table 1.

TABLE 1. METEOROLOGICAL DATA DURING THE GROWING SEASON
AT STATE COLLEGE, PA., 1933-1934
Temperature* in Degrees F.

Week of	Average daily maximum		Average daily minimum		Average daily mean		Weekly precipitation inches	
	1933	1934	1933	1934	1933	1934	1933	1934
April 1	56.7	63.7	39.4	40.3	48.8	52.0	1.73	1.21
April 8	60.9	58.0	35.6	35.0	48.2	46.5	1.10	1.32
April 15	62.7	60.8	43.7	36.8	53.2	48.8	1.89	0.42
April 22	60.4	59.4	33.1	32.8	46.8	46.7	0.23	0.21
April 29	71.4	73.3	51.0	45.3	61.2	59.6	1.23	0.13
May 6	72.6	75.0	44.3	50.3	51.3	62.5	2.38	0.46
May 13	71.7	73.1	50.7	45.3	61.2	59.2	0.99	0.21
May 20	80.1	74.7	56.0	51.4	68.8	63.8	1.27	0.52
May 27	74.4	83.6	53.1	53.4	63.8	68.6	0.98	0.22
June 3	87.9	83.4	61.0	59.1	74.6	71.4	1.61	0.22
June 10	75.1	80.6	53.6	55.5	64.3	68.1	0.22	0.48
June 17	84.6	82.9	58.3	61.4	71.4	72.1	0.23	3.32
June 24	89.9	88.1	63.3	64.1	76.6	76.1	0.32	0.12
July 1	81.6	88.0	57.9	63.7	69.7	75.9	2.53	0.63
July 8	80.3	82.3	56.7	60.0	68.5	71.1	trace	0.55
July 15	85.3	89.1	57.9	60.1	71.6	74.7	trace	0.26
July 22	85.4	91.9	62.3	63.1	73.8	84.6	0.56	1.81
July 29	89.9	80.6	66.1	59.4	78.0	70.0	0.45	0.88
Aug. 5	80.4	81.4	57.4	59.3	68.9	70.4	1.39	0.35
Aug. 12	81.6	77.0	59.1	61.1	70.4	69.1	0.46	1.20
Aug. 19	74.7	77.6	59.6	56.3	69.1	66.9	4.29	0.86
Aug. 26	78.4	71.7	55.1	45.6	67.5	58.6	0.08	0.18
Sept. 2	82.1	76.4	59.3	54.0	70.7	65.2	0.88	0.05
Sept. 9	69.4	74.9	53.3	59.7	61.4	66.6	0.78	0.72
Sept. 16	69.9	71.0	53.9	51.7	61.9	61.4	0.96	2.01
Sept. 23	77.9	74.7	58.9	58.7	65.9	65.7	0.81	2.38

Sources of Seed

Stock seeds were submitted for trial by the Associated Seed Growers, Inc., New Haven, Conn.; Connecticut Agricultural Experiment Station, New Haven, Conn. (corn); Ferry-Morse Seed Co., Detroit, Mich. (cabbage); Glick's Seed Farms, Smoketown, Pa. (tomatoes); D. Landreth Seed Co., Bristol, Pa.; J. M. Lupton and Son, Inc., Mattituck, Long Island, N. Y. (beets, cabbage, and other crucifers); Zwaan and deWiljes, Scheemda, Holland (spinach, cabbage, crucifers).

Commercial seeds were purchased from or were submitted by the following firms:

Abbott and Cobb, 4655-61 Paul St., Frankford, Philadelphia, Pa.

Associated Seed Growers, Inc., New Haven, Conn.

W. Atlee Burpee Co., Philadelphia, Pa.

Henry A. Dreer, 1306 Spring Garden St., Philadelphia, Pa.
C. A. Eagley and Sons, North Girard, Pa.
Ferry-Morse Seed Co., Detroit, Mich.
Alexander Forbes and Co., 22 West Park St., Newark, N. J.
John L. Geswein, North and 2nd Sts., Ironton, Ohio.
Gill Bros. Seed Company, Portland, Oregon.
Glick's Seed Farms, Smoketown, Pa.
Joseph Harris Co., Inc., Coldwater, New York.
Hart and Vick, Rochester, N. Y.
The Holmes Seed Co., 224 Cleveland Ave., N. W., Canton, Ohio.
George Joa, 706 Forty-fifth St., Brooklyn, N. Y.
Lagomarsino and Sons, 712 J Street, Sacramento, Cal.
D. Landreth Seed Co., Bristol, Pa.
Leonard Seed Co., 333-355 West 35th Street, Chicago, Ill.
The Chas. H. Lilly Co., Mt. Vernon, Washington.
K. C. Livermore, Honeoye Falls, N. Y.
J. M. Lupton and Sons, Mattituck, Long Island, N. Y.
S. Meisch, Secaucus, N. J.
The Farm of Paschke, North East, Pa.
Pieters-Wheeler Seed Co., Gilroy, Cal.
Jerome B. Rice Seed Co., Cambridge, N. Y.
Walter S. Schell, Inc., 10th and Market Sts., Harrisburg, Pa.
Francis C. Stokes and Co., Inc., P. O. Box 932, Philadelphia, Pa.
Stumpf and Walter Co., 132-138 Church St., N. Y. C., N. Y.
Tether Seed Co., 104 Broadway, Paterson, N. J.
Thornber Nursery, Hamilton, Montana.
F. H. Woodruff and Sons, Milford, Conn.
A. F. Yeager, No. Dak. Agricultural College, Fargo, N. D.
Zwaan and deWiljes Seed Co., Inc., Scheemda, Holland.

Dwarf Stringless Beans

The varieties of beans which are best adapted for Pennsylvania conditions are Stringless Greenpod, Giant Stringless Greenpod, Tender-green, and Stringless Black Valentine, all of which are round-podded, long, green varieties for market and canning; Stringless Green Refugee, a round-podded, short, green variety for canning; Pencil Pod, Round Pod Kidney, and Brittle Wax, which are round-podded, yellow varieties for market and canning; Bountiful, a flat-podded, green, market variety; and Sure Crop Wax or Yellow Bountiful, a flat-podded, yellow, market variety.

Trials of dwarf stringless beans in 1933 included 43 varieties and strains which were planted on July 6 and first harvested on August 25; in 1934 there were 49 varieties and strains, which were planted on July 2 and first harvested on August 21. In both seasons, the earliest varieties matured in 50 days.

Table 2 gives the appearance and performance of certain of the varieties and strains. Dimensions of pods were measured on specimens considered to be ideal for the particular strain. The percentage of pods which were typical, as reported for the 1934 trials, was ascertained by counting the specimens which were considered to con-

form satisfactorily to the prevailing type of the uninjured, well-developed pods in a random sample of 100 or more pods. Estimates on three or more random samples within a strain were found to differ from each other by seven per cent or less; it is probable that differences between strains less than 15 per cent are not significant in this respect. The yields per acre were estimated from the yield per 100 feet of row, with rows 30 inches apart. The yields are subject to considerable experimental error, because the tests were not replicated; strains that were relatively high or low in both seasons probably were different from other strains in yielding power. The strain differences were not very decided in many cases.

Other varieties of dwarf stringless beans with distinctive characteristics studied in 1933 and 1934 included Conserva or Konserva, a small, green, round-podded bean adapted for canning, but not so productive as Refugee; Full Measure, a green, round-podded variety which is fairly productive, but not so much so as Giant Stringless, and less uniform and more constricted between seeds than the latter variety; Fordhook Favorite, a productive, green, round-podded, white-seeded variety which resembles Stringless Greenpod in form of pod but is a little shorter; Webber or Crackerjack Wax, Unrivalled Wax, Challenge Black Wax, Improved Golden Wax, and New Kidney Wax, all of which are flat-podded, fairly straight, wavy along the sutures, and quite productive, but shorter than Sure Crop Wax; and Davis Kidney Wax, a white seeded, flat-podded wax variety which compares favorably with Sure Crop Wax in most respects, except that it is stringy.

TABLE 2. SUMMARY OF TRIALS OF DWARF STRINGLESS BEANS

Variety	Sedsman		Strain designation	Days to maturity		Yield in lbs. per acre		Width of pods in inches	Length of pod in inches	Type of pods	Percentage of typical pods	
				1933	1934	1933	1934					
Stringless Greenpod	Assoc. Seed Gro.	-----	Asgrow 46078	56	52	4518	9382	5 1/4	3/8	Oval, smooth, curved	63	
Stringless Greenpod	Assoc. Seed Gro.	-----	-----	-----	-----	52	5402	5	7/16	Nearly straight, smooth	-----	
Stringless Greenpod	Assoc. Seed Gro.	-----	-----	10	56	52	4496	9032	3/8	Curved, smooth, broad-oval to round	74	
Stringless Greenpod	Assoc. Seed Gro.	-----	-----	-----	56	52	8033	4 3/4	5/16	Broad-oval in cross section, curved, somewhat constricted between seeds.	66	
Stringless Greenpod	Assoc. Seed Gro.	-----	Ferry-Morse	-----	56	52	6621	5 1/2	5/16	Slightly curved	34	
Giant Stringless Greenpod	Assoc. Seed Gro.	-----	46083	56	52	11500	5 1/4	5/16	Nearly circular in cross section, smooth, some purple flecks	34		
Giant Stringless Greenpod	Assoc. Seed Gro.	-----	-----	23	56	5033	5 1/2	3/8	Curved a little near tip, somewhat constricted between seeds	-----		
Giant Stringless Greenpod	Assoc. Seed Gro.	-----	-----	-----	56	52	6586	6796	7/16	Broad-oval, somewhat constricted between seeds, straight	38	
Giant Stringless Greenpod	Assoc. Seed Gro.	-----	Ferry-Morse	-----	56	52	8172	12545	5 1/4	Oval, fishy, somewhat crooked	37	
Giant Stringless Greenpod	Assoc. Seed Gro.	-----	-----	-----	56	52	14113	5 1/2	7/16	Oval, deep, green in color, a little constricted between seeds.	58	
New Stringless Greenpod	Assoc. Seed Gro.	-----	46115	56	52	3136	12872	5	5/16	Oval, slightly curved, smooth	36	
Tendergreen	Assoc. Seed Gro.	-----	1815	50	52	4269	12872	5 3/4	7/16	Oval, slightly curved, a few constrictions, a few purple flecks	35	
Tendergreen	Assoc. Seed Gro.	-----	Landreth	-----	52	11500	5 1/8	7/16	Oval, slightly curved, a few constrictions, a few purple flecks	35		
Tendergreen	Assoc. Seed Gro.	-----	Stokes	-----	-----	52	11850	5 3/4	3/8	Oval, slightly curved, a few constrictions, a few purple flecks	60	
Tendergreen	Assoc. Seed Gro.	-----	Woodruff	-----	-----	52	12023	5 3/4	3/8	Oval, some a little creasebacked, nearly straight, dark green.	53	
Stringless Green Refugee	Assoc. Seed Gro.	-----	96617	61	56	4147	-----	4 3/4	5/16	Nearly straight, circular in cross section, smooth, purple-flecked	-----	
Stringless Green Refugee	Assoc. Seed Gro.	-----	Landreth	-----	64	71	5088	7492	4 3/4	Nearly straight, circular in cross section, smooth, purple-flecked	46	
Asgrow Valentine	Assoc. Seed Gro.	-----	46128	50	56	8329	10978	6 1/4	7/16	Oval in cross-section, slightly curved	76	
Asgrow Stringless Valentine	Assoc. Seed Gro.	-----	Asgrow 96776	50	56	6256	-----	5 1/2	Oval in cross-section, sickle-curved	-----		
Stringless Black Valentine	Assoc. Seed Gro.	-----	Harris	-----	50	56	4966	5 1/2	7/16	Similar to Harris' strain	68	
Stringless Black Valentine	Assoc. Seed Gro.	-----	Landreth	-----	50	56	7946	10804	6 1/4	Flattened oral cross-section, slightly curved	44	
Stringless Black Valentine	Assoc. Seed Gro.	-----	Stokes	-----	58	58	10982	5 1/2	7/16	More oval than above, more curved	62	
Stringless Black Valentine	Assoc. Seed Gro.	-----	Woodruff	-----	52	52	8886	5 1/2	7/16	Similar to Harris' strain	58	
Bountiful	Assoc. Seed Gro.	-----	46063	56	52	4874	-----	6 1/2	Flat, somewhat curved	54		
Bountiful	Assoc. Seed Gro.	-----	Ferry-Morse	-----	56	52	13417	6	9/16	Smooth, somewhat curved	50	
Bountiful	Assoc. Seed Gro.	-----	Harris	1794	56	52	6046	13106	6	9/16	Smooth, somewhat curved, smooth	5/8
Bountiful	Assoc. Seed Gro.	-----	-----	-----	56	52	3799	13592	6 1/2	Flat, slightly curved, smooth	76	

Bountiful	Landreth	56	52	9514	16902	6	9/16	44
Green Bountiful	Schell	56	52	5402	6	1/2	70	Flat, slightly curved, smooth
Bountiful	Stokes	52	52	13784	6	1/2	40	Flat, somewhat curved, smooth
Bountiful	Woodruff	52	52	13340	6	1/2	27	Flat, somewhat curved, smooth
Assoc. Seed	Gro.	36	5563	-----	6	1/2	3/8	Slightly crease-backed, sickle-curved, a little constricted between seeds.
Assoc. Seed	Gro.	33	56	4356	14114	5	3/8	22
Brittia Wax	Landreth	56	58	-----	6	1/2	3/8	Slightly crease-backed, sickle-curved, a little constricted between seeds.
Brittia Wax	Landreth	56	58	3820	8931	5 3/4	3/8	38
Brittia Wax	Landreth	56	56	6970	61/2	3/8	30	Irregularly curved, round, a little constricted between seeds.
Assoc. Seed	Gro.	56	56	3729	-----	6	3/8	Sickle-curved, slightly crease-backed, not very smooth.
Assoc. Seed	Gro.	56	57	15510	6	3/8	33	Nearly straight, broad oval
Assoc. Seed	Gro.	56	58	8136	16106	6	3/8	33
Ferry-Morse	Harris	56	56	4025	-----	6	3/8	Slightly curved, round
Landreth	Landreth	56	58	7841	-----	5 3/4	3/8	Sickle-curved, slightly crease-backed
Woodruff	Woodruff	56	57	9235	5 1/2	7/16	28	Sickle curved, broad oval.
Assoc. Seed	Gro.	46152	56	4478	-----	6 1/4	7/16	Irregularly curved, broad oval
Assoc. Seed	Gro.	56	57	20560	6	1/2	47	Nearly straight, flat, smooth
Ferry-Morse	Harris	56	57	5367	122900	6 1/4	47	Slightly s-curved, flat, a little wavy along sutures
Landreth	Landreth	56	56	38363	97593	6 1/4	56	Nearly straight, flat, smooth
Kellow Bountiful	Schell	58	58	9932	6	1/2	62	More curved than other strains
Kellow Bountiful	Schell	58	58	4531	6	1/2	50	Somewhat curved, flat, a little wavy along sutures

Lima Beans

Bush Lima Beans

Strains of Fordhook varied a little in size of pod, size of seeds, and earliness. Strain 4318X of the Associated Seed Growers was larger in pod and seed than other strains, but was 3 to 5 days later in maturity; Burpee's strain No. 65 was earliest and smallest of the strains tested in 1933 and 1934; Landreth's and Schell's strains were intermediate in both respects. The earliest strains were somewhat less prolific than the others. All were green seeded. Burpee Improved was larger podded than Fordhook, but less prolific. Deer Bush Lima was quite prolific but considerably later than Fordhook. Wood Prolific had weak, spreading vines with dark green, smooth leaves, and produced a great number of small, thin-walled pods with small, white seeds. It matured with the later Fordhook strains. Henderson Bush Lima was somewhat similar to Wood Prolific but was smaller seeded and earlier. Burpee's New Philadelphia had larger, broader pods than Henderson Bush, but the seeds were of the same size; the plants were larger and a little more erect than those of Henderson Bush, and were fully as prolific. Two strains of Jackson Wonder differed a little in color of immature seed, though both were mainly white. This variety is very prolific, but is not likely to be commercially important because of the conspicuous purple markings of the mature seeds.

Pole Lima Beans

Large Green Seeded is well named, but the seeds were not larger than those of several other varieties. Seeds of this variety were a somewhat brighter green than those of other varieties of which the seeds are green when immature, including Leviathan, Giant Podded, Carpenteria, King of the Garden, New Wonder Pole, Ideal, Burpee Best, and one strain of Challenger. Of these varieties, Giant Podded, Ideal, and Leviathan had the largest pods and very large seeds; Giant Podded had slightly the largest seeds, followed by King of the Garden. One strain of Challenger was earlier than other varieties and strains, but had creamy white seeds when immature. Seeds of this variety were shorter than those of the other varieties named, and more crowded in the pods. Pods of Early Leviathan were thin and, in consequence, were easily shelled. New Wonder and King of the Garden were quite similar to each other.

Beets

Forty-eight strains of beets were tested in 1933, and fifty-three in 1934. Special attention was given to strains of the following varieties: Early Wonder, which has a top-shaped root of medium depth, with characteristic alternate layers of dark and light red flesh, or zones; Crosby Egyptian, which differs but little from Early Wonder, although some strains are more nearly turnip-shaped than that variety; Detroit Dark Red, a globular variety with an even, dark red interior; Ohio Canner and similar varieties, which have very small tops and small to medium, globular, uniform roots with even, dark red inter-

riors; Half-Long Blood, a tapering, long, top-shaped root with even, dark red interior color. Strains differ considerably in uniformity, in interior color, and in size of tops; the last named characteristic is important in bunching varieties but of little consequence in canning or topped beets.

Beets were planted on June 26 in 1933, and records were made on September 25. In 1934, beets were planted on July 2, and records were made of Early Wonder strains on September 6 and of other sorts from September 21 to 27. The trials consisted of a single 25-foot row of each strain. Rows were 18 inches apart, and plants were thinned to a stand of about five beets per foot of row.

Notes on the characteristics of varieties and strains were taken in 1933. These are here summarized:

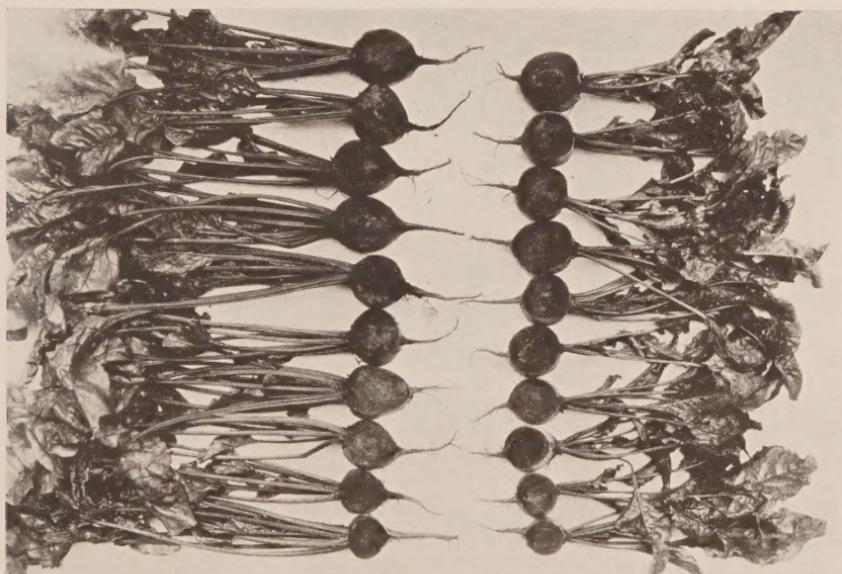


FIG. 1. TWO STRAINS OF THE SAME VARIETY OF BEET, THE DETROIT DARK RED. Each is more satisfactory for a special purpose than the other; the strain on the left, for bunching; the strain on the right, for canning.

Early Wonder

L35.2, N110.2, D111.1, and L7.11M (Asso. Seed Gro.) had uniformly large, upright tops; the tops of the first strain were mostly dark maroon, those of the second mixed bronze and green, and of the other mostly green. Early Wonder from Stumpf and Walter and from Joseph Harris Co. had smaller tops which were mostly green. Strain L35.2 of the Associated Seed Growers and the Harris strain were somewhat smaller and more uniform than other strains. Strain N110.2, L7.11M (Asso. Seed Gro.) and Harris' strain were largest and had the most uni-

form, dark interior color. Strain L35.2 and the Harris strain varied in form of root from shallow top-shaped to globular; the other strains varied from shallow top-shaped to turnip-shaped.

Crosby Egyptian

from Stokes, Ferry-Morse, and N1.1M.

N1.4M, N103.10, and N104.1 from Associated

ed Seed Growers, had erect, mixed green and bronze, large tops; Abbott and Cobb's Special had very large, mostly green, erect tops; the strain from Harris had small, maroon tops. The last strain had deep top-shaped roots; that of Abbott and Cobb and N1.4M from Associated Seed Growers varied from medium top-shaped to turnip-shaped; other strains were medium top-shaped. Abbott and Cobb's strain and N1.1M and N1.4M had the darkest colored roots, both internally and externally.

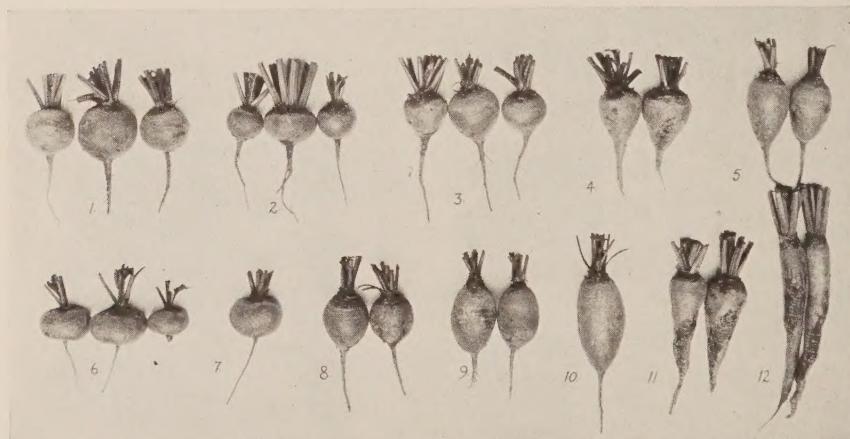


FIG. 2. FORMS OF BEETS

1. Globular. 2. Shallow top-shaped. 3. Medium top-shaped. 4. Deep top-shaped. 5. Oval. 6. Medium turnip-shaped. 7. Deep turnip-shaped. 8. Short spindle-shaped. 9. Medium spindle-shaped. 10. Long-spindle-shaped. 11. Half-long. 12. Long.

Detroit Dark Red

The strains with largest tops were those of Stokes and Landreth (Landreth Best); with

medium-sized tops, Abbott and Cobb, Gill Bros., Ferry-Morse (Improved), Asso. Seed Gro. (Standard N105.1, New Strain D106.1, and N106.2) and Zwaan and deWiljes; with small tops, Harris' Special, Lupton's Perfected Detroit, and Stumpp and Walter's; with uniform shape, Harris Special, N105.1 and N106.1 of Assoc. Seed Gro., Lupton's Perfected Detroit; with uniform external color, Stumpp and Walter, Zwaan and deWiljes, Landreth, and Lupton; with darkest interior color, Zwaan and deWiljes and Lupton; with most tendency to zoning of interior color, Stumpp and Walter, D5.1 and N106.1 of Assoc. Seed Gro., although no strains were particularly unsatisfactory in this respect.

Ohio Canner

and other canning varieties were generally uniform in interior color, which was dark maroon without banding or zoning. The shape varied from deep turnip-shaped in *Ohio Canner* to short spindle shaped in *Ferry-Morse's Good For All*. Other very satisfactory varieties in this general group were *Ferry-Morse's Crimson King* and *Forbes' Superb*.

Tests in 1934 were based on twenty beets of each strain, taken at random from the 25-foot rows. Descriptions were made statistically, by recording the percentages of the total number which exhibited a particular characteristic (Table 3).

Most strains of root crops vary considerably at State College, particularly in form of roots, because of the heavy, stony soil; hence specimens which could be classed under several similar forms were counted as being typical. The percentages are subject to a considerable sampling error, especially when less than 50 per cent; the sampling error is relatively less for the larger percentages. Strains of the same variety differ considerably in form, color, and size of both roots and tops.

TABLE 3. SUMMARY OF

Variety	Seedsman	Strain designation	Typical form
Asgrow Wonder	Assoc. Seed Gro.	U8.1M	Medium to deep top-shaped
Asgrow Wonder	Assoc. Seed Gro.	U8.2M.	Medium to deep top-shaped
Early Wonder	Assoc. Seed Gro.	D111.1	Medium to deep top-shaped
Early Wonder	Assoc. Seed Gro.	135.2	Medium to deep top-shaped
Early Wonder	Assoc. Seed Gro.	N110.2	Shallow to deep top-shaped
Early Wonder	Ferry-Morse	63309	Medium to deep top-shaped
Early Wonder	Harris		Deep top-shaped
Crosby Egyptian	Assoc. Seed Gro.	N1.1M	Shallow top shaped
Crosby Egyptian	Assoc. Seed Gro.	N1.3M	Medium to deep top-shaped
Crosby Egyptian	Assoc. Seed Gro.	N1.4M	Medium to deep top-shaped
Crosby Egyptian	Assoc. Seed Gro.	N1.5M	Medium to deep top-shaped
Crosby Egyptian	Assoc. Seed Gro.	N1.7M	Mainly globular
Crosby Egyptian	Assoc. Seed Gro.	N1.8M	Shallow to deep top-shaped
Crosby Egyptian	Assoc. Seed Gro.	N103.10	Medium turnip shaped
Crosby Egyptian	Assoc. Seed Gro.	N104.1	Medium to deep top-shaped
Crosby Egyptian Special	Abbott & Cobb Dreer	Special 7	Deep top-shaped Medium to deep top shaped
Crosby Egyptian	Ferry-Morse	Special	Shallow to deep top-shaped
Crosby Special Toston Crosby	Stokes F. H. Woodruff		Shallow to deep top-shaped Deep top-shaped
Detroit Dark Red	Assoc. Seed Gro.	U5.1M	Deep top-shaped
Detroit Dark Red	Assoc. Seed Gro.	U5.2M	Globular
Detroit Dark Red	Assoc. Seed Gro.	U5.3M	Globular
Detroit Dark Red	Assoc. Seed Gro.	U5.4M	Globular
Detroit Dark Red	Assoc. Seed Gro.	N105.2	Globular
Detroit Dark Red	Assoc. Seed Gro.	N105.3	Globular
Detroit Dark Red	Abbott & Cobb Ferry Morse		Globular
Detroit Dark Red	Ferry Morse	Ferry's 67478	Medium spindle shaped
Detroit Dark Red	Harris	Morse's 63306	Globular
Detroit Dark Red	Landreth	Select	Short spindle shaped
Perfected Detroit	Lupton		Medium spindle shaped
Black Knight	Sehell		Globular
Detroit Dark Red	Stokes		Globular
Detroit Dark Red	Woodruff		Short spindle shaped
Ohio Canner	Lupton		Deep top-shaped
Good for All	Ferry-Morse	62089	Medium spindle shaped
Crimson King	Ferry-Morse		Medium spindle shaped
Improved Crimson	Dreer		Medium spindle shaped

(a) Irregular beets included those not symmetrical or otherwise misshapen.

(b) Rough beets included those with corky surface extending more than one-third the distance from crown to taproot, or with pronounced hairiness; roughness increases with age, and if not extreme, is not a serious fault.

* Zoning in these two strains was not pronounced, though uniformly present.

BEET VARIETY TRIALS IN 1934

% Typical	% Regular (a)	Character of tops							
		% Small less than 1½" diam.	% 1½"-3"	% Large more than 3" diam.	% Med.	% Dark red interior	% Not noticeably zoned	% Dark red exterior	% Smooth surface (b)
90	90	40	50	10	85	60	60	90	Large, erect, bronze, with some leaf spot.
85	85	40	45	15	85	85	70	75	Medium sized, erect, mixed bronze, with much leaf-spot.
80	80	50	40	10	55	70	55	70	Small, erect, mostly green, healthy.
75	85	30	50	20	20	30	30	85	Medium sized, somewhat spreading, mixed bronze, healthy.
95	not recorded	40	40	20	70	55	70	65	Very small, spreading, mostly green, healthy.
80	95	40	50	10	0	40	55	65	Fairly large, somewhat spreading, mostly green, healthy.
45	95	15	75	10	55	60	60	80	Medium sized, spreading, mixed bronze, healthy.
45	80	30	50	20	55	70	65	45	Large, erect, mixed bronze and green, healthy.
75	90	50	50	0	80	70	80	60	Medium sized, somewhat spreading, mixed color, some leaf spot.
50	85	50	50	0	90	45	100	75	Medium sized, spreading, mixed color, healthy.
85	85	40	60	0	85	60	100	75	Large, spreading, mostly green, some leaf spot.
55	85	45	55	0	95	70	100	65	Large, nearly erect, mostly green, some leaf spot.
95	75	30	70	0	90	100	85	75	Large, nearly erect, green, healthy.
50	90	15	65	20	35	0*	90	35	Medium, nearly erect, mixed color, healthy.
80	80	30	45	25	60	10*	75	50	Medium, somewhat spreading, mixed color, healthy.
60	45	45	40	15	65	35	95	35	Medium, erect, mixed bronze, healthy.
70	85	35	50	15	75	50	85	65	Above medium, erect, mixed color, some leaf spot.
60	80	10	80	10	55	60	70	60	Medium, somewhat spreading, mixed color, healthy.
70	65	45	45	10	5	55	25	50	Small, erect, bronze, healthy.
55	80	25	75	0	75	65	85	30	Small, spreading, mixed bronze, much leaf spot.
70	not recorded	50	50	0	90	90	95	15	Small, somewhat spreading, mixed color, much leaf spot.
60	not recorded	45	55	0	95	90	95	10	Medium, somewhat spreading, mixed color, much leaf spot.
45	75	40	60	0	95	75	100	25	Below medium, somewhat spreading, mixed color, much leaf spot.
60	75	55	45	0	100	75	100	20	Small, spreading, mixed color, some leaf spot.
60	65	60	35	5	100	100	100	30	Large, nearly erect, mixed green, healthy.
60	85	35	60	5	85	80	100	20	Medium, mixed green, healthy.
60	60	45	55	0	95	80	80	0	Small, spreading, mixed green, healthy.
70	70	30	55	15	100	65	75	60	Below medium, spreading, mixed green, healthy.
60	65	30	65	5	100	40	80	35	Small, spreading, mixed green, healthy.
35	90	40	50	10	100	85	95	40	Large, erect, mixed green, healthy.
60	65	15	60	25	85	35	80	20	Medium, spreading, mixed green, healthy.
35	80	40	55	5	100	95	100	25	Large, erect, mixed green, healthy.
70	65	10	45	45	90	60	85	25	Medium, fairly erect, mixed green, some leaf spot.
50	50	20	70	10	70	70	60	50	Large, fairly erect, mixed green, healthy.
55	55	20	60	20	90	35	90	45	Medium, spreading, mixed green, some leaf spot.
45	not recorded	50	50	0	95	100	95	25	Above medium, fairly erect, mixed bronze, much leaf spot.
85	90	25	75	0	100	100	100	10	Small, spreading, green with maroon veins, healthy.
70	40	25	55	20	100	85	100	100	Small, spreading, green with maroon veins, healthy.
50	65	35	65	0	100	40	100	10	Small, spreading, green with maroon veins, some leaf spot.

Early and Midseason Cabbages

The most desirable early round variety of cabbage is Copenhagen Market, one strain of which is called Golden Acre by many seedsmen. The range in size, uniformity, character of plant and earliness of the different so-called Golden Acre and Copenhagen Market strains is very wide (Table 4). The number of days from seeding to maturity varied from 127 and 171. Marion Market is a very late strain which is relatively resistant to cabbage yellows.

Early Jersey Wakefield is the most desirable early pointed variety. As with Copenhagen Market, strains differ widely in earliness, character of plant and head, and uniformity. Late, broad-conical strains may be designated Charleston Wakefield; as with Copenhagen Market, however, there is no distinct difference between Early Jersey and Charleston Wakefield when a number of strains of each are compared. This variety is later than the earlier strains of Copenhagen Market, varying between 140 and 157 days from seeding to first harvesting.

Enkhuizen Glory, or Glory of Enkhuizen, is the most desirable mid-season variety; it is especially good for making kraut. It differs from the typical Copenhagen Market in plant characteristics chiefly, being more leafy, somewhat larger, more erect, and with more wavy leaves. Enkhuizen Glory, however, is one of the Copenhagen Market group of varieties; this name probably should include many so-called Copenhagen Market strains which require more than 145 days from seeding to maturity.

In 1933, seeds were sown on February 13 to 17; the plants were transplanted once in flats before being set in the field on April 24. The corresponding dates in 1934 were February 22 for sowing the seed, and April 23 and 24 for field planting. In both seasons, the crop was grown with overhead irrigation on fairly fertile soil which had been in sod for several years and upon which 1000 pounds of 4-16-4 fertilizer were broadcast and harrowed in before planting. Rows were 30 inches apart and plants were 18 inches apart in the rows. Control of pests was secured in both seasons. In 1933, a row of 127 plants of each variety, without replication, constituted the trials; in 1934, 100 plants were recorded.

With few exceptions, all varieties were grown both seasons; the results for most varieties were quite similar in the two seasons. |

Late Cabbages

In 1934, the late cabbage trials were damaged considerably by black-leg disease; for this reason no measurements or weights were recorded. Attention was given chiefly to strains of Danish Ballhead or Holland-er, in view of the fact that numerous previous trials had shown this variety to be the most desirable late market and storage type for Pennsylvania. Other varieties were Earliest Redhead, Mammoth Rock Red (3 strains), Savoy (7 strains), Danish Drumhead, Stein Flat Dutch, Houser, and New Late Ni-tram.

Strains of Danish Ballhead differ in height of stem, shape of head, uniformity, and disease resistance. Of the 11 strains grown, the

originator's strain of Penn State Ballhead, grown by J. M. Lupton and Sons, was most uniform in shape of head, height of stem and plant, and size. Plants were 10 inches tall when measured from the base of the stem to the top of the head. Heads were short obovate, somewhat flattened on top. Ferry-Morse's Hollander No. 62635 was slightly more variable in form of head, but more nearly globular than Penn State Ballhead; the stems were short and uniform, but a little taller than the Penn State strain. Lilly's Danish Ballhead Zero No. 7736 was larger than either of the above strains; it had uniformly globular, solid heads. Two strains of yellows-resistant Hollander, Wisconsin No. 8 of Ferry-Morse, and Wisconsin Hollander No. 7978 of Lilly, differed a little, the latter strain having a little larger and flatter heads than the former and a little coarser plant. Both strains were satisfactorily uniform in size and form of heads, which were mostly globular, and were less damaged by blackleg than were any other strains of Danish Ballhead.

Houser is quite vigorous and disease-resistant but is variable both in form and size of heads, in height and spread of plant, and in time of maturity.

Danish Drumhead was a variable strain of Danish Ballhead; it has somewhat flattened heads of medium size.

New Late Ni-tram had short stemmed, relatively small, fairly healthy plants which produced very large, flat heads.

The strains of red cabbage differed but little except in plant character, of which two types could be distinguished. The differences were mainly in the degree of spreading of the outer leaves.

Savoy types differed considerably in size of plant and degree of savoying. American Drumhead Savoy from Stumpp and Walter, Special Long Island Savoy from Woodruff, and Special Drumhead Savoy No. 4 from Dreer were similar, evenly savoyed, short-stemmed, fairly uniform, and deep green. Savoy Improved American from Ferry-Morse and Earliest Savoy from Schell were similar, fairly tall, and somewhat lighter green than the above strains. Baby Savoy from Schell had a much shorter stem and smaller head than other strains, and was considerably damaged by blackleg.

TABLE 4. SUMMARY OF EARLY CABBAGE TRIALS, 1933 AND 1934

Variety	Seedsmen	Strain	Days to maturity	Per cent producing heads	Average weight of head, pounds	Per cent typical	Type
Golden Acre	Burpee	175	136	90	2.40	-----	Head globular, smooth; plants large, with wavy, erect leaves.
Golden Acre	Dreer	9	127	100	1.87	87	Head globular, smooth; plants variable in type and size.
Golden Acre	Ferry-Morse		127	100	2.28	86	Head globular, smooth; plants variable in type and size.
Golden Acre	Forbes	Special	128	94	3.00	87	Head globular, smooth; plants large, variable.
Golden Acre	Forbes	Super	128	98	2.30	-----	Head globular, smooth; plants small, with smooth, spreading leaves.
Golden Acre	Harris		130	99	2.68	95	Head globular, smooth; plants large, dark green, uniform, with spreading leaves.
Golden Acre	Harris	Special	128	94	2.41	96	Head globular, smooth; plants small, with smooth, spreading leaves.
Golden Acre	Lilly	7376	142	99	2.87	86	Head globular, smooth; plants large, with wavy, erect leaves.
Golden Acre	Livingston		135	98	2.55	87	Head globular, smooth; plants fairly large, variable, uniform, with wavy, erect leaves.
Golden Acre	Lupton		144	99	3.04	94	Head globular, smooth; plants large, uniform with medium spreading leaves.
Golden Acre	Stokes		130	98	2.56	96	Head globular, smooth; plants medium sized, with wavy, erect leaves.
Golden Acre	Stokes	Viking	145	95	2.73	100	Head globular, wrinkled at base; plants small, with wavy, erect leaves.
Golden Acre	Woodruff		146	96	2.94	94	Head globular, smooth; plants medium sized, uniform, with wavy, erect leaves.
Golden Acre	Zwaan and deWijes		146	100	2.50	88	Head globular, smooth; plant large, leafy, spreading, with wavy leaves.
Copenhagen Market	Burpee	178	151	100	2.83	86	Head globular, smooth; plant large, leafy, fairly upright, with wavy leaves.
Copenhagen Market	Ferry-Morse	56463	151	100	3.01	91	Head globular, smooth; plant medium sized, erect.
Copenhagen Market	Harris	151	100	2.80	80	Head globular, smooth; plant medium sized, erect.	
Copenhagen Market	Lilly	7044	131	100	2.75	81	Head globular, smooth; plant large, erect, variable, with wavy leaves.
Early	Schell		165	100	4.01	77	Head globular, smooth; plant medium sized, dark colored, upright.
Copenhagen Market	Stokes		151	100	2.88	92	Head globular, smooth; plant small, uniform, upright.
Copenhagen Market	Stumpf & Walter		168	100	3.89	71	Head globular, smooth; plant large, variable; many leaves with lilac tinge.
Copenhagen Market	Zwaan & deWijes		165	100	3.61	71	Head globular, smooth; plant very large, erect, uniform.
Large Late Copenhagen	Harris		158	95	4.10	82	Head globular, smooth; plant very large, spreading, uniform.

Manion Market	Ferry Mornse		171	190	3.65	80	
Matton Market	Lilly		158	98	3.83	86	Head globular, smooth; plant medium sized, somewhat spreading.
Early Jersey Wakefield	Abbott & Cobb		140	99	2.49	86	Head globular, smooth; plant medium sized, dark green, variable.
Early Jersey Wakefield	Burpee	168	140	96	2.59	75	Head pointed, variable; plants medium, spreading, with blue-green, smooth leaves.
Early Jersey Wakefield	Lilly	7732	140	100	2.22	70	Head pointed, variable; plants large, spreading, with blue-green, smooth leaves.
Early Jersey Wakefield	Lupton	Extra	140	100	2.11	94	Head pointed, typical; plants small.
Early Jersey Wakefield	Stokes		140	100	2.22	10	Head pointed, relatively broad, with few broad leaves; plant, low, not leafy.
Charleston Wakefield	Lupton		157	98	2.76	83	Head pointed, broad; plant large, dark blue-green.
Charleston Wakefield	Stokes		157	97	2.49	90	Head pointed, broad; plant large, lighter colored than above.
Enkhuizen Glory	Harris		157	98	2.56	85	Head pointed, broad; plant very large, smooth leaved.
Enkhuizen Glory	Lilly	6979	100	2.86	85	Head globular, smooth; plants uniform, medium sized.	
Glory of Enkhuizen	Lupton		157	99	2.68	90	Head globular, smooth; plants very uniform, small.
Glory of Enkhuizen	Stokes		151	99	3.05	72	Head globular, smooth; plants variable, of medium size.
Glory of Enkhuizen	Woodruff		168	100	3.53	94	Head globular, smooth; plants medium sized, spreading, similar to Copenhagen.
Glory of Enkhuizen	Zwaan & deWijns		190	99	4.82	79	Head globular, smooth; plants large, uniform.
Stavanger-Tory	Joa		190	99	3.44	Very uniform	Head globular, smooth; plants large, uniform.
All Head Early	Stokes		168	98	2.60	Very uniform	Head flat, smooth; plants short, spreading, uniform.
Bugner	Woodruff		190	99	3.45	Very uniform	Head globular, smooth; plants very large, erect, uniform form.

Carrots

The varieties of carrots which are commercially important in Pennsylvania are Chantenay, a uniform, large, abruptly stump-rooted, fairly smooth, early variety of satisfactory orange color and medium length, with large, strong tops; Red Cored Chantenay (Improved Chantenay, Coreless Chantenay, Rubicore), which is a little shorter and broader, not so smooth or regular, but deeper colored than Chantenay, and with a darker, less conspicuous core; Danvers Half-long, which is later, smoother, and not quite so broad or abruptly tapering as Chantenay, with a smaller top and less prominent crown, and frequently with a lighter colored, more distinct core; Hutchinson, a distinct strain of Danvers which is longer and more gradually tapering, with more rounded shoulders than other strains; Imperator, which is a stump-rooted variety with roots somewhat longer than those of Chantenay, and about as good color in the best specimens as Red Cored Chantenay, but less uniform in shape and color, and with smaller tops; Perfection, which is intermediate between Imperator and Nantes in



FIG. 3. FORMS OF CARROTS

1. Long stump-rooted. 2. Medium stump-rooted. 3. Short stump-rooted. 4. Medium half-long. 5. Long. 6. Short cylindrical. 7. Medium cylindrical. 8. Long cylindrical.

form and Nantes (Coreless, Touchon), an early variety with small, smooth, nearly cylindrical, well-colored roots and very small tops.

The trials of carrots in 1934 included 28 strains. These were planted in 30-foot rows without replication on June 7. They were seeded thickly; when the tops were about four inches tall they were thinned to a stand of six plants to the foot of row. Records were made on October 18 and 19, on random samples of 20 plants of each strain, and included the numbers of roots which fell in each of certain classes based on form, regularity, smoothness, exterior and interior color, size, and conspicuousness of the core (Table 5). The typical form was considered to be the form, or closely related forms, which represented the largest percentage of roots. The sampling error probably is not so great as in the beet trials, because of the somewhat greater uniformity in most strains and because of a smaller number of well defined forms.

TABLE 5. SUMMARY OF TRIALS OF CARROT VARIETIES IN 1934

(6) The form of closer related forms including the greatest number of roots

(a) The form or closely related forms including the greatest number of teeth.

(b) Irregular roots included unsymmetrical or other missshapen specimens.

Irregular roots included unsymmetrical or other misspelled specimens. Roots in which the color of the core was as deep as the outer region were classed as coreless.

Celery

Celery varieties and strains are difficult to classify because they frequently overlap to some extent. The main types include the yellow, of which Golden Self-Blanching is typical; early green, of which Easy Blanching is a representative variety; and late green, of which Giant Pascal is the original type. Three major strains may be recognized in the yellow type—Golden Plume, Golden Self-Blanching, and Golden Phenomenal. Strains of Easy Blanching are not particularly distinct, although small differences may be noted in the relative number and thickness of stalks, particularly in the heart. Strains of Giant Pascal are fairly distinct, with Fordhook, Emperor, or Houser, representing a short, early type with relatively few stalks, nearly free from ribs, smooth, cylindrical, very brittle, and of high quality; Salt Lake, which is intermediate in size, and about equal to Giant Pascal in brittleness and freedom from ribs; Winter Queen and Columbia, which are similar to Salt Lake in size, but are lighter green, more spreading, and coarser; and the original Giant Pascal, which is tall, erect, fairly coarse, but brittle and of very good quality.

The characteristics which were studied in the strain tests of 1933 and 1934 were the plant height of the strains, the height of the outer stalks to the first branches, the relative number and thickness of stalks, smoothness or freedom from ribs, and the quality. In 1933, seed of the yellow and early green strains were sown in flats in the greenhouse on February 20, transplanted to other flats on March 13, and planted in the open, six inches apart in rows three feet apart, on May 17. Late varieties were sown in the cold frame on April 18 and were transplanted into the field on July 3. In 1934, all varieties were sown in flats in the greenhouse on February 20 and handled similarly to the early varieties in 1933. Early varieties matured about on August 1 in 1934. Sixty-five strains were grown. These may be classified as follows:

Golden Self-Blanching Distinctly yellow when blanched, with straight, erect, numerous, relatively slender, close-ribbed stalks 19 inches tall, 10 inches from base to first branches, tough, of poor quality. Heart medium. Golden Self-Blanching (Pieters-Wheeler, Stokes). Yellow Hybrid No. 20 (Ferry-Morse).

Golden Plume Somewhat taller than Golden Self-Blanching, paler yellow, with thicker, coarser stalks, somewhat ribbed, medium brittle, of fair quality. Heart fairly full. Stalks 22 inches tall, 10 inches to first branches. Golden Plume (Dreer No. 274, Harris, Schell, Stokes), Wonderful (Woodruff), Golden No. 14 (Abbott and Cobb). Several strains of Golden Plume are earlier and shorter, especially from the base to the first branches, and have somewhat fuller heart and a little better quality. The height of these strains was 19 inches, and the height to the first branches $7\frac{1}{2}$ inches. Among such strains were Early Fortune (Abbott and Cobb), Florida Golden (Ferry-Morse, Schell), Yellow Hybrid No.

23 (Ferry-Morse), Golden Detroit (Ferry-Morse), Meisch's Special (S. Meisch), and Golden Prize (Tether).

Golden Phenomenal

This is somewhat similar to Golden Plume, but a little taller, and somewhat higher to the first branches. The stalks are erect, somewhat ribbed, a little more slender than Golden Plume strains, with a little less heart, but not perceptibly different in quality. Golden Phenomenal (Ferry-Morse, Forbes, Harris, Stokes), Golden Wonder (Hart and Vick).

Easy Blanching

is bright green in color, large, tall, with numerous stalks which are fairly thick, moderately ribbed, fairly brittle and of good quality. Heart full. Easily blanched, early. Total height 22 inches; height to first branches, 10-11 inches. Easy Blanching (Dreer No. 270, Ferry-Morse, Woodruff), Earligreen (Stumpp and Walter). Several strains of Easy Blanching are somewhat shorter below the first branches, fuller in the heart, and of a little better quality. Among these are Full Heart Easy Blanching (Abbott and Cobb), A and C Sweetheart (Abbott and Cobb), Easy Blanching Hybrid (Ferry-Morse), Newark Market (Forbes, Woodruff) is a smaller strain of Easy Blanching, which has a more slender stalk, with less prominent ribs than the better known strains.

Emperor, Fordhook, or Houser strains differ through a considerable range in height, spread of leaves, smoothness, character of leaf, brittleness, and uniformity. The strains may be grouped as small, intermediate, and large. Small strains characteristically have a medium number of short, smooth, cylindrical stalks free from ribs, thick, very brittle, and of best quality. These strains are about 18 inches tall, and 5-6 inches from the base to the first branches. They are somewhat more uniform than the larger strains. Leaflets are dark green, little incised, with blunt serrations. Among them were Fordhook (Assoc. Seed Gro.), Stocky Emperor No. 11A (Ferry-Morse), Fordhook Emperor (Schell), and Houser (Lagomarsino, Landreth). Intermediate strains were a little taller, more erect, with somewhat more numerous, more slender stalks with noticeable ribs, but nearly cylindrical and quite brittle. Among these strains were Emperor (Forbes), Fordhook (Burpee), and Houser (Schell). The large strains were scarcely distinguishable from Giant Pascal. Stalks are straight, erect, somewhat broad and flattened near the base, distinctly ribbed, brittle, and of very good quality; they were somewhat more numerous than in smaller strains, and hearts were fuller. Leaflets were sharply incised and less smooth than in smaller strains. Among such strains were Heavy Emperor No. 2A, Emperor No. 2443, and commercial Emperor (Ferry-Morse) and Emperor (Holmes). The largest strain was Heavy Emperor No. 2A. Intermediate strains were less susceptible to breakdown than either small or large strains.

Giant Pascal

The following were typical, large strains of this variety: Giant Pascal (Ferry-Morse, Holmes, Schell, Woodruff), Giant Pascal Special Strain (Harris).

Giant Pascal, Jersey Private Strain (Forbes) was smaller and more spreading than the other strains, with somewhat more cylindrical, distinctly ribbed stalks.

Salt Lake differs from other Giant Pascal strains in being smaller, a little more easily blanched, and somewhat duller green in color. Salt Lake (Ferry-Morse, Harris, Stokes) and Allheart (Schell) were indistinguishable.

Sweet Corn

Results of sweet corn trials are reported for 1934 only, because the tests in 1933 suffered reverses which rendered the data on relative earliness, total yield, and market quality somewhat unreliable. In 1933 the seed was planted on May 25; an uneven stand resulted because of very dry weather immediately after planting. A severe attack of bacterial wilt delayed maturity of first-early varieties, and a violent storm in August damaged late varieties considerably. Information on the relative susceptibility of varieties to damage from the wilt disease, however, was secured in 1933.

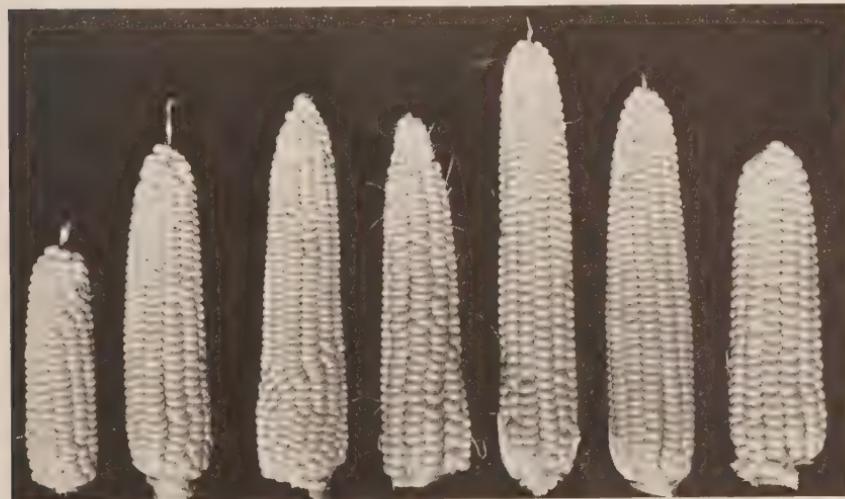


FIG. 4. COMPARISON OF ORDINARY OR OPEN-POLLINATED SWEET CORN WITH HYBRIDIZED EARS OF THE SAME VARIETY

1. Spanish Gold, open-pollinated. 2 and 3. Spanish Gold, top-cross. 4. Golden Sunshine, open-pollinated. 5 and 6. Golden Sunshine, top-cross. 7. Whipple Yellow, open-pollinated.

Seventy-two strains and varieties were tested in 1934. These were planted on May 25. Germination was uneven because of the dry weather, as in 1933. Some plants of each variety appeared at about the same time, however, and the different varieties were, therefore,

influenced similarly as regards earliness. The number of ears harvested at the first pickings was evidently not similarly influenced by the adverse conditions, as shown by the uneven stands; for this reason these data are not reported.

Single test plots of each strain were planted containing three rows of twenty hills, each with three plants, except where less than this number germinated. The hills were three feet apart in either direction. The land was fertilized with 500 pounds of 4-16-4 fertilizer, broadcast before planting. Records were made on the middle row

TABLE 6. SUMMARY OF

Variety	Seedsman	Strain	Days to maturity*	Average ears per 100 stalks	Percentage of ears marketable	Average weight per ear ounces
Early Yellow Varieties						
Golden Early Market	Harris	1023	68	110	42	5.8
Golden Gem	Livermore		68	100	17	3.7
Early Yellow Sensation	Woodruff		68	84	69	7.1
Extra Early Yellow	Woodruff		68	117	37	7.5
Extra Early Bantam	Harris	1013	68	129	40	5.0
Spanish Gold	Assoc. Seed Gro.	D170.3	68	127	23	4.6
Spanish Gold	Landreth		68	158	39	5.1
Spanish Gold	Livermore		68	114	40	4.5
Top Cross Spanish Gold	Assoc. Seed Gro.	U170.1	78	89	68	8.6
Golden Sunshine	Assoc. Seed Gro.	D168.1	78	63	60	9.1
Second Early Yellow Varieties						
Top Cross Sunshine	Assoc. Seed Gro.	U168.1	85	103	85	10.7
Top Cross Sunshine	Livermore		85	83	80	9.6
Tendergold	Leonard		85	90	58	8.5
Tendergold	Woodruff		85	90	64	9.0
Whipple Yellow	Assoc. Seed Gro.	U178.1	85	90	77	10.6
Whipple Early Yellow	Ferry-Morse		85	65	73	9.9
Whipple Yellow	Harris	989	82	84	56	9.8
Whipple Yellow	Harris	990	82	72	72	9.3
Whipple Yellow	Woodruff		85	70	61	11.2
Top Cross Whipple	Assoc. Seed Gro.	U180.5	82	81	85	11.3
Golden Bantam	Landreth		82	57	69	7.2
Improved Golden Bantam	Assoc. Seed Gro.	N172.5	82	55	67	8.4
Burbank Bantam	Assoc. Seed Gro.	U135.1	82	25	43	7.4
Top Cross Burbank	Assoc. Seed Gro.	U135.2	85	106	81	9.3
Top Cross Golden Bantam	Assoc. Seed Gro.	U174.7	85	98	78	10.4
Top Cross Bantam L & S	Assoc. Seed Gro.	U140.1	85	80	85	7.5
Top Cross Bantam	Livermore		85	98	70	8.0
Midseason Yellow Varieties						
Golden Cross Bantam	Assoc. Seed Gro.	M138.1	88	116	84	9.6
Golden Cross Bantam	Assoc. Seed Gro.	U138.2	88	114	86	9.9
Golden Cross	Landreth		88	110	82	9.8
Golden Cross	Leonard		88	109	90	10.1
Golden Cross	Livermore		88	108	93	10.7
Golden Inbred Hybrid	Landreth	B	88			
Gold Coin	Burpee		88	93	52	9.0
Charlevoix	Ferry-Morse	67494	88	113	67	7.8
Buttercup	Harris	996	88	95	64	7.2
Golden Giant	Harris	986	91	111	72	9.8
Late Yellow Varieties						
Late Golden Sunrise	Landreth	Tall	96	142	79	10.2
Bantam Evergreen	Assoc. Seed Gro.	U12.4	99	87	71	12.6
Bantam Evergreen	Ferry-Morse		100	97	82	9.9
Top Cross Bantam Evergreen	Assoc. Seed Gro.	U13.2	99	98	82	11.7
Bantam Evergreen Hybrid	Assoc. Seed Gro.	U24.39	93	101	83	10.2
Bantam Evergreen Hybrid	Assoc. Seed Gro.	U8.15	99	96	70	11.2

only for each variety. Attention was paid chiefly to early, second early, and midseason yellow varieties.

All data in Table 6 are from trials in 1934, except as to susceptibility to wilt damage, which include observations in 1933, when wilt damage was far more severe than in 1934. As a rule, the later and more vigorous a variety, the less subject it is to damage from bacterial wilt disease. It was observed, also, that wilt damage in 1933 was more severe on those strains which had suffered the loss of roots from various root-rot diseases.

SWEET CORN TRIALS, 1934

Length of ear inches	Number of rows of kernels	Height of stalk, feet	Quality	Relative wilt susceptibility	Remarks
7 1/2	10-12	4	Fair	Very susceptible	Quite susceptible to smut
7	8	3	Excellent	Very susceptible	Somewhat susceptible to smut
8	12-14	5 1/2	Fair	A little susceptible	
7 1/2	8-12	5	Fair	Somewhat susceptible	Quite susceptible to smut
7	8	5 1/2	Very good	Somewhat susceptible	Somewhat susceptible to smut
7 1/2	8-10	5	Good	Somewhat susceptible	Medium susceptible to smut
7 1/2	8-10	5	Good	Somewhat susceptible	Medium susceptible to smut
7 1/2	8-10	5	Good	Somewhat susceptible	Medium susceptible to smut
8 1/2	12-14	6	Good	Little susceptible	Very vigorous
8	8-18	4 1/2	Very good	Quite susceptible	Medium susceptible to smut
8	12-14	6	Excellent	Quite resistant	Vigorous and uniform
8	12-14	6	Excellent	Quite resistant	Vigorous and uniform
8	12-14	5 1/2	Excellent	Quite resistant	Fairly vigorous, uniform
8	12-14	5 1/2	Excellent	Quite resistant	Fairly vigorous, uniform
9	10-16	6	Good	Somewhat resistant	A little susceptible to smut
9	10-16	6	Good	Somewhat resistant	A little susceptible to smut
9	10-16	5 1/2	Good	Somewhat resistant	A little susceptible to smut
9	10-16	5 1/2	Good	Somewhat resistant	A little susceptible to smut
9	10-16	6	Good	Somewhat resistant	A little susceptible to smut
9	12	6 1/2	Good	Somewhat resistant	Very vigorous
9	8	5	Excellent	Susceptible	A large, vigorous strain
7 1/2	12	5	Excellent	Susceptible	A variable strain
8 1/2	12	4 1/2	Good	Susceptible	Husks rather thin
8	14	6	Excellent	Not susceptible	A vigorous, healthy strain
8	12	6	Excellent	A little susceptible	A vigorous, healthy strain
8 1/2	12	6	Excellent	Not susceptible	A vigorous, healthy strain
8	8	6	Excellent	Not susceptible	A vigorous, healthy strain
8 1/2	12	6	Excellent	Not susceptible	A vigorous, healthy strain
8	8	6	Excellent	Not susceptible	A vigorous, healthy strain
8 1/2	12	6 1/2	Excellent	Resistant	Strains were indistinguishable
8 1/2	12	6 1/2	Excellent	Resistant	
8 1/2	12	6 1/2	Excellent	Resistant	
8 1/2	12	6 1/2	Excellent	Resistant	
8 1/2	12	6 1/2	Excellent	Resistant	
7	8	4 1/2	Excellent	Resistant	
10	12-14	4-7	Very good	A little susceptible	A true Bantam type
8	12	5	Very good	A little susceptible	A little smut
9 1/2	8-12	5 1/2	Good	Fairly resistant	Considerable smut
8 1/2	12-18	7	Fair	Fairly resistant	Husks long, tight
10	12-14	9 1/2	Excellent	Quite resistant	Husks long, tight
9	12-14	8 1/2	Good	Quite resistant	Husks long, tight
		8 1/2	Good	Quite resistant	More uniform than above strains
		8	Good	Quite resistant	
8 1/2	12	8	Good	Quite resistant	Less uniform than top cross
9	12	6 1/2	Good	Quite resistant	Uniform

TABLE 6. SUMMARY OF

Variety	Seedsman	Strain	Days to maturity*	Average ears per 100 stalks	Percentage of ears marketable	Average weight per ear ounces
Early and Midseason White Varieties						
Gill's Early Market	Harris	992	68	40	50	7.5
Mammoth White Cory	Ferry-Morse		78	13	0	5.9
Independence	Dreer	4	81	105	81	9.0
Vanguard	Stokes		81	89	78	10.9
Whipple Early	Harris	963	85	117	77	10.2
Crosgreen Hybrid	Assoc. Seed Gro.	N273.1	91	106	60	9.4
Late White Varieties						
Redgreen Hybrid	Assoc. Seed Gro.	N272.1	93	108	80	9.8
Redgreen Hybrid	Landreth		93	110	76	9.0
Redgreen Hybrid	Livermore		93	84	82	10.2
Stowell Evergreen	Landreth		93	87	77	12.5
Clark Early Evergreen	Asso. Seed Gro.	N65.2	99	95	74	13.6
Evergreen Hybrid	Assoc. Seed Gro.	U14.5	102	114	77	12.5
Money Maker	Landreth		104	105	62	11.5
Narrow Grain Hybrid	Assoc. Seed Gro.	U26.63	104	77	87	17.1
Country Gentleman	Assoc. Seed Gro.	U22.1	104	84	72	11.8
Country Gentleman	Landreth		104	91	70	12.0
Top Cross Country Gentleman	Assoc. Seed Gro.	U25.5	104	84	72	11.8
Country Gentleman Hybrid	Assoc. Seed Gro.	U19.24	104	86	86	14.1
Country Gentleman Hybrid	Assoc. Seed Gro.	U19.9	107	161	84	12.3

* Because germination was delayed by dry weather, the number of days to maturity was somewhat greater, and differences among strains were less pronounced, than in the average season.

SWEET CORN TRIALS, 1934 (Continued)

Length of ear inches	Number of rows of kernels	Height of stalk, feet	Quality	Relative wilt susceptibility	Remarks
7	10-14	3½	Fair	Very susceptible	Lacking in vitality
7	12	4	Fair	Very susceptible	Some smut
8	14	6	Good	A little susceptible	Quite uniform
8	16-20	5	Fairly good	Fairly resistant	Damaged by smut
9½	14	6	Good	Fairly resistant	Husks loose
				Quite resistant	
7½	12-16	7	Excellent	Fairly resistant	Husks long, tight
7½	12-16	7	Excellent	Fairly resistant	Husks long, tight
7½	12-16	7	Excellent	Fairly resistant	Husks long, tight
8	16	9	Fairly good	Fairly resistant	Some root rot and smut
8½	14	7½	Fairly good	Fairly resistant	Uniform, vigorous
9	16	7½	Medium	Fairly resistant	Uniform, vigorous
10	10-14	9½	Good	Resistant	Healthy, vigorous
8½	20-24	9	Good	Resistant	Healthy, vigorous
7½	Kernels uniform, ½ inch long	8	Fairly good	A little susceptible	Husks rather loose
7½	Kernels not uniform, ½ inch long	7½	Fairly good	A little susceptible	Husks rather loose
7½	Kernels uniform, except at tip	8½	Fairly good	A little susceptible	Husks rather loose
8½	Kernels uniform, very long	8½	Fairly good	A little susceptible	Husks rather loose
9	Kernels variable, some shrunken	9	Fairly good	A little susceptible	Husks rather loose

Lettuce

Several strains of New York lettuce produced a satisfactory number of marketable heads under conditions prevailing in the spring and fall of 1934. These included New York No. 12, from several seedsmen, an early, short-stemmed, slightly oblate-headed variety with relatively few outer leaves; New York No. 5 (61985) and No. 41 (Ferry-Morse) and New York No. 5084 (Sehell) which were oval-headed and somewhat taller than the No. 12 strains; New York No. 515 (Pieters-Wheeler) which, though somewhat variable in type of plant, produced a high percentage of marketable heads; and New York Imperial No. 3, Imperial No. 152, and Imperial C (Assoc. Seed Gro.). The conditions prevailing during the spring were adverse; those varieties which produced any considerable number of marketable heads that year may be considered as dependable.

White Big Boston was somewhat more susceptible to tipburn than New York strains. Several strains were quite satisfactory in heading properties; these included White Boston 26-22 (Ferry-Morse) and White Boston No. 661 (Stokes). Big Boston No. 553 (Harris) was a satisfactory strain of this variety.

Market Peas

Several smooth-seeded varieties were quite early and prolific, though rather low in flavor and tenderness. Among these were Extra Early (Ferry-Morse), Mammoth-podded Extra Early (Harris), and First and Best (Stokes), all of which were quite similar to each other. Pods were about three inches long, round, blunt-tipped, and well filled. Vines were semi-dwarf, 20 to 28 inches tall. These varieties were planted on April 10 and were ready for picking on June 9, or 60 days after planting.

Laxton Superb from several seedsmen and Early Bird (Holmes) were apparently the same variety. This is a large, flat-podded, very prolific, smooth pea with dwarf, vigorous plants, second-early in season, maturing about a week later than the varieties described above. Pods were four inches long, tapering at the tip, well-filled; peas were large and fair in quality.

Among the earliest wrinkled peas suitable for market was World Record or Improved Gradus. This matured about three days later than the extra early smooth types, when planted at the same time. Vines were semi-dwarf, fairly productive and, in some strains, susceptible to damage by root rot. Pods were $3\frac{1}{2}$ inches long, flattened, with tapering tip, fairly well filled; peas were fairly large, bright green, and sweet. Strains of World Record from Ferry-Morse, Associated Seed Growers, and Landreth were quite similar and were earlier, less vigorous and healthy in vine, and slightly less productive than World Record from Stokes and Woodruff. Easy Money (Woodruff) resembled the earlier strains of World Record. Gradus or Prosperity from Landreth was somewhat similar to the larger, later strains of World Record.

Varieties of the Laxtonian group, including Laxtonian, Laxton Progress, Hundredfold, Twentieth Century, and Blue Bantam, were generally somewhat similar, although pods of Laxton Progress from several sources were a little longer and peas were a little smaller than in other strains. This variety was a little earlier than the others. Pods of this group were dark green, 4 to $4\frac{1}{2}$ inches long, nearly straight, medium broad, tapering at the tip, and well filled; peas were large, bright green, uniform, and excellent in quality. Vines were blue-green in foliage, vigorous, fairly healthy, dwarf, and very productive. Varieties of this group matured about a week later than the extra early smooth varieties.

Thomas Laxton strains were approximately four days later than those of the Laxtonian group. Vines were medium tall, fairly vigorous, and quite productive. Pods were three inches long, round, blunt, and tightly filled with large peas of excellent quality. There was little difference among the several strains.

Among the midseason varieties, Onward, Improved Stratagem, and Dwarf Telephone each had certain strains maturing in about 75 days and others in 80 to 85 days. Onward and Improved Stratagem were similar in pod characteristics, having pods $3\frac{1}{2}$ inches long, nearly round, sometimes a little creasebacked, medium blunt at the tip, and fairly well filled with rather large, medium green, sweet peas of excellent quality. The strains differed somewhat in height of plants and earliness. Improved Stratagem (Assoc. Seed Gro.) and Wonderful (Schell) were early, dwarf strains; Improved Stratagem (Harris) and Onward (Assoc. Seed Gro. and Harris) were semi-dwarf, later strains.

Pods of Dwarf Telephone were 4 to $4\frac{1}{2}$ inches long, broad, tapering at the tip, and well filled with large, bright green peas of best quality. Earlier, dwarf strains included Morse's Market No. 62013 (Ferry-Morse) and Dwarf Telephone (Assoc. Seed Gro.). Dwarf Telephone (Ferry-Morse) was a little taller and slightly later. Mid-season Giant (Harris) and Asgrow No. 40 (Assoc. Seed Gro.) were the tallest, latest, and most vigorous and productive strains, with largest pods. The last named strain was somewhat more vigorous than the others.

Peppers

Seeds of the peppers under trial in 1934 were planted in flats in the greenhouse on March 20. Seedlings were transplanted into other flats with a $1\frac{1}{2}$ inch spacing on April 4, and were transplanted again on April 19, into 3-inch paper bands. Twenty-five plants of each strain were set in the field on May 31, in single plots; the rows were three feet apart, and plants were two feet apart in the rows. The area was fertilized with 800 pounds per acre of 4-16-4 fertilizer, broadcast before planting. First fruits reached satisfactory size for harvesting as green peppers on July 16, when 29 fruits were picked from Early Giant (No. 498, Harris), 23 from Woodruff's Colossal, 17 from King of the North (No. 503, Harris) and from World Beater (Stokes), 16 from Ruby King (Landreth), 15 from Oshkosh (No. 485, Harris), 9

from California Wonder (U36.1M, Assoc. Seed Gro.), and from Asgrow World Beater (U37.1M Assoc. Seed Gro.), and smaller numbers from several strains of World Beater, Ruby King, and California Wonder.

Strains of all varieties were quite variable in type, as judged by shape of fruit, number of locules and other characters; in fact, uniformity was not found to any considerable degree in any strain.

The strains were quite similar in color within a given variety. Fruits of Ruby King were a little brighter in color than other sweet red varieties, with World Beater intermediate and California Wonder dullest, although satisfactory in this respect. Oshkosh and Golden Queen were yellow when mature.

Pumpkins and Squashes

Strain tests for several seasons have failed to disclose any important differences among strains of the standard varieties, except in the Straightneck strain of the older Golden Summer Crookneck summer pumpkin, which is well named.

Delicata pumpkin and Buttercup squash are recent introductions producing small fruits suitable for baking in the half shell. Both deserve trial in comparison with Table Queen or Acorn pumpkin, which is used for a similar purpose. Delicata is a little larger than Table Queen, has a smooth surface with a conspicuous green and yellow striped color pattern, and has somewhat sweeter, moister, and less stringy flesh when baked. Buttercup is a true squash, with thick, fine-grained flesh which is dry, mealy, and excellent in flavor when baked.

Blue Hubbard is the most vigorous and productive of the Hubbard varieties. It has a dull, blue-green, somewhat wrinkled surface, and thick, yellowish green, fine-grained flesh. Boston Marrow is the most productive of the large, orange-fleshed squashes. Golden Delicious, though not so productive as Boston Marrow, is worthy of trial because of its excellent quality, attractive appearance, and thick, firm flesh.

Edible Soybeans

Forty-one varieties of edible soybeans, supplied by W. J. Morse of the United States Bureau of Plant Industry, Washington, D. C., were grown in 1933, and seeds of a considerable number were tested at different stages of maturity to ascertain their palatability when prepared in several ways. The cooking tests were made by Anna M. Light, a graduate student in Home Economics. These soybeans were quite palatable when prepared in a variety of ways, in any stage of maturity from nearly full grown until partially dry. In the less mature condition, the soybeans were quite palatable when prepared as green peas; in later stages, they may be substituted in recipes for dry beans. The pods are quite tough, but may be removed easily after being steamed for a few minutes.

TABLE 7. SUMMARY OF PEPPER STRAIN TRIALS, 1934

Variety	Seedsman	Strain	Typical form				Character of plant	
			No.	Wt. lb.	100 Plants Yield per	Average weight of fruits, oz.	Average weight of flesh, inches	Percentage weight of fruits
Early Giant	Harris	499	1112	218	3.0	3/16	.53	40
World Beater	Assoc. Seed Gro.	U37.1M	716	180	3.7	3/16	.45	82
World Beater	Landreth		712	174	3.9	3/16	.52	83
World Beater	Schell		512	146	4.5	3/16	.65	74
Marvelous	Schell		760	180	3.8	3/16	.68	80
World Beater	Stokes		648	149	3.7	3/16	.53	88
Woodruff's Colossal	Woodruff		728	168	3.7	3/16	.53	12
California Wonder	Assoc. Seed Gro.	U36.1	540	132	3.9	5/16	.71	95
California Wonder	Ferry-Morse	67960	444	119	4.3	3/8	.67	83
California Wonder	Landreth		708	187	3.9	3/8	.54	91
California Wonder	Schell		640	166	4.2	5/16	.52	90
California Wonder	Stokes		532	161	4.8	3/8	.64	88
Peerless King	Woodruff		612	173	4.5	3/8	.50	88
Asgrow King	Assoc. Seed Gro.	U38.1M	---	---	---	---	---	---
Ruby King	Assoc. Seed Gro.	N480.1	676	176	4.2	1/8	.70	70
Ruby King	Landreth		656	134	3.3	3/16	.52	44
Ruby King	Stokes		720	154	3.4	3/16	.61	39
King of the North	Harris	503	872	206	3.8	1/8	.60	27
Oshkosh	Harris	485	133	2.5	1/4	49	83	33
Golden Queen	Schell		800	140	2.8	1/8	.50	75

The following numbered varieties matured during the growing season when planted on May 25, and produced seeds nearly as large as small lima or the ordinary green shell or Horticultural beans: 19979, 80462, 81029, 81031, 81039, 84608, 86040, 88813, 89154.

Edible soybeans may be planted to provide variety in the diet. The plants are quite prolific and are not ordinarily attacked to any considerable extent by insects, including the Mexican bean beetle.

Spinach

Bloomsdale Reselected and Bloomsdale Longstanding strains were quite similar in size, color, and degree of savoying, but differed somewhat in longstanding characteristics, Bloomsdale Longstanding being slower in developing seedstalks than the former strain. Strains differed a little in erectness of the petioles. Among the more erect, longstanding strains tested in 1933 and 1934 were Longstanding Savoy (Forbes), Longstanding Bloomsdale (Assoc. Seed Gro. N530.2, Ferry-Morse, Harris, Landreth, Lilly's 97-7731, and Schell) and Bloomsdale Savoy (Lupton). Slightly earlier, less erect, and less longstanding, but otherwise similar were Dark Green Bloomsdale (Stokes), and Bloomsdale Reselected (Lilly's 35-7250 and Landreth). Reselected Bloomsdale (Zwaan and deWiljes) was less savoyed and more spreading than other strains of this variety, and was intermediate in leaf characteristics between the ordinary Bloomsdale Savoy and King of Denmark.

King of Denmark showed no distinct strain differences. New Summer (Forbes) and Emerald Standing (Zwaan and deWiljes) resembled this variety in all respects. There were, likewise, no strain differences in Juliana and in Longstanding Gaudry (Giant Nobel, Giant Thick Leaf, New Giant Leaf, Giant Eskimo, Longstanding Nobel). Juliana strains were early, compact, low-growing, much savoyed, and very dark green; Longstanding Gaudry strains were medium green, smooth, large, and spreading.

Virginia Savoy (Blight Resistant Savoy) and Old Dominion differed in petiole, the former being quite thick, long, and erect, the latter more spreading and smaller; there was little difference in size of leaf blade and degree of savoying, although the former was the more savoyed. Old Dominion was somewhat more longstanding than Virginia Savoy; neither, however, was satisfactory in this respect in spring trials. Both were excellent in fall trials.

Standwell Prickly and Hollandia Prickly (Zwaan and deWiljes) were smooth-leaved, heavy, large, dark green varieties of best quality, suitable for growing in the fall for home use or canning.

Tomatoes

Tomatoes were seeded in flats in the greenhouse on March 16 in 1933 and March 21 in 1934, transplanted to other flats two weeks later, potted in 4-inch pots four weeks after seeding, and planted in the field on May 23 and 24, in both 1933 and 1934. Thirty plants of each strain were planted in two separate plots of 15 plants each, in

a single row, with plants four feet apart in rows five feet apart. The plot was fertilized with 800 pounds of 4-16-4 fertilizer, broadcast before the last harrowing.

Varieties were grouped, and strains and varieties of a particular group were grown in blocks, so as to bring similar types as nearly as possible under similar field conditions. All tests were in duplicate. Seventy-two strains were compared in 1933 and 68 in 1934. The groups studied most closely were Earliana, Bonny Best, Break O'Day, Pritchard, Globe, Greater Baltimore or Stone, and Marglobe.

Technical studies during several seasons, with yield records by pickings and by individual plants, have shown that differences are not significant between strains unless greater than 25 per cent in total yield, or greater than 40 per cent in yield during the first two weeks of the harvesting season. On this basis, strains were not found to be significantly different in productiveness or earliness, within the groups; the Earliana group was the only one significantly earlier than other groups, and lower in total yield. The Bonny Best, Break O'Day, and Pritchard groups or varieties were somewhat later than Earliana and a little earlier than the other groups, but were not significantly different from each other in earliness.

Because small differences in productiveness and earliness could not be shown by the methods used in these trials, greater attention was paid to uniformity and type, in which respects fairly distinct differences could be recognized. As evidence of this, groups of seed growers and specialists studied the tests each season, and independently observed the typical characteristics of certain strains when they were in their period of heaviest production. Their opinions on the relative merits of different strains agreed remarkably well with the opinions of members of the Experiment Station staff.

Earliana

The following strains were tested in one or both of the two seasons: Penn State Earliana (C. E. Myers), Select Earliana (Landreth), Sunrise (Landreth), Earliana No. 1 and No. 2 (Landreth), Selected Earliana (Gill Bros.), Lange Earliana (Stokes), Extra Early Earliana 604 (Harris), Canadian (Harris), Morse Special Early No. 498 (Ferry-Morse), Speed (Thornber), and Red River No. 4 (Dreer). The differences in fruit shape and size among these strains were not very great. Penn State Earliana, Sunrise, and Morse Special Early were less flattened or oblate than the other strains, which were generally medium oblate. Lange's Earliana, Earliana No. 1, and Speed were less uniform in size and shape of fruits than other strains. Sunrise and Canadian produced somewhat larger fruits than others. Plants of Speed were quite variable in size and vigor, some being of medium size and others small and determinate, or self-topping. Dreer's Alpha No. 4 was similar to Earliana in type of fruit, but had broad or potato-type foliage.

The typical fruit characteristics of Earliana are: form oblate, sometimes tapering somewhat toward the apex, or peach-shaped, often irregular; skin often slightly checked and cracked concentrically about

the stem, not very smooth; color medium red, sometimes with radial green markings at apex and near stem; outer and inner walls thick and meaty but not very firm; seed cavities irregular with relatively few seeds; quite subject to rotting.

The plants have relatively small leaves, and, are quite subject to leaf-spot diseases, frequently being defoliated except at the tips of the branches, and are moderately vigorous except as noted above.

Bonny Best

strains in the tests included Bonny Best Certified (Landreth), Bonny Best Super-Standard (Stokes), Bonny Best Special (Stokes), Bonny Best 633 (Harris), Bonny Best (Schell), Select Koshara Bonny Best (Landreth), Select Bonny Best Certified (Landreth); among strains of similar or related type were John Baer 634 (Harris), John Baer Improved (Landreth), John Baer, Special Strain (Rice), Chalk Jewel No. 3 (Eagley), Clark Special "A" U41.3, Clark Special Early N44.1M, and Clark Special "B", N40.2M (Assoc. Seed Gro.), and The Landreth (Landreth).

In fruit characteristics, the John Baer strains, The Landreth, and Clark Special "A" were more nearly globular or less flattened than other strains; Rice's Special Strain of John Baer and Clark Special "A" had slightly thicker outer walls; Chalk Jewell No. 3, The Landreth, and Clark Special Early produced many large, smooth fruits. Plants of the John Baer strains, Chalk Jewel No. 3, Clark Special Early, and The Landreth were larger, more leafy, and less damaged by leaf-spot diseases than those of other strains. Purple Bonny (Geswein) was identical with Bonny Best except in color, as the name indicates.

The typical fruit characteristics of this group are: form oblate to nearly globular, regular; color bright, medium red, uniform; outer and inner walls medium in thickness, well colored, fairly firm; locules distinct, fairly seedy; not badly subject to cracking, but quite susceptible to blossom-end rot. The plants are fairly large, spreading, vigorous and moderately leafy, and are generally susceptible to leaf-spot diseases, particularly early blight.

Break O'Day

strains were indistinguishable, except

Grothen Red Globe (Glick), which was

different in plant characteristics; plants of this strain were much less open and sprawling, and had considerably denser foliage. The fruits, however, were quite similar in all strains: form globular, smooth, uniform; outer walls fairly thick, inner medium; locules distinct, not very seedy; color bright red when fully ripe, but orange-red previously; size large, uniform. Plants of the typical strains have long, rather slender branches with sparse foliage which resembles that of Earliana in appearance, but is not so susceptible to leaf-spot diseases.

Pritchard or Scarlet Topper

The fruits were quite similar in form to those of Break O'Day, but were more variable in size. Plants were stocky, determinate, with fairly coarse, dense foliage which was moderately susceptible to leaf-spot diseases. Strains differed but little: Landreth's and

Glick's Certified Pritchard and Stokes' Pritchard were among the most uniform. Lincoln (Paschke) resembled Earliana in plant characteristics, but was more healthy, and produced fruits similar in form and color to those of Pritchard but smaller and more variable in size.

Marglobe

Sixteen strains were observed in 1933, and 14 in 1934, including stock secured in 1928 from the originator, the late F. J. Pritchard of the U. S. Department of Agriculture. The recently developed strains showed no types which differed from certain plants in the original stock. One type in the original strain evidently has been isolated by certain seed growers, and another by others, with the result that clearly different strains now exist. The certifying agents in Pennsylvania and New Jersey have shown preference for the medium to fairly large, globular, smooth fruits with very thick outer and inner walls and irregularly shaped locules with few seeds, and to the more compact, vigorous plants with coarse, dense foliage. In conformity with these preferences, the following strains have been bred: Marglobe Certified (Glick, Landreth, Hurff, Campbell Soup Co.) and Master Marglobe Certified (Stokes). Several foliage types have been bred by the D. Landreth Seed Co., including the regular type described above, a Light Foliage type adapted to heavy, fertile soils, and a Heavy Foliage type for light, sandy soils where sunscald often causes serious damage. All are similar in type of fruit. Marglobe N43.1M and T46.7M (Assoc. Seed Gro.) and Marglobe 57814 (Ferry-Morse) were quite similar to the certified strains.

Globe

strains were somewhat different from each other in fruit form and size, Walter Richards (Landreth) being somewhat larger and more oblate than Hillborn Selected Certified Globe (Glick). Livingston Globe (Ferry-Morse) was intermediate between the two strains mentioned, having nearly globular, purple fruits of medium size, with fairly thick outer walls and medium inner walls, and fairly distinct, regular locules with a medium number of seeds. Fruits of this variety were inclined to crack concentrically about the stem; this was specially true of Hillborn Selected Certified Globe. Gulf State Market (Ferry-Morse) was quite similar to Globe in fruit and plant characteristics; Cooper Special (Ferry-Morse) resembled Globe in fruit, but the plant was determinate or self-topping, and the foliage was quite dense, in contrast with the spreading, large plant of Globe, with its rather open foliage.

Greater Baltimore and Stone

strains were not clearly distinct from each other. Several strains of the former had larger and somewhat more oblate fruits than those of certain Stone strains, but certain other strains of Stone had the largest fruits in the group. The latter strains, however, were deeper oblate than the fruits of the Baltimore strains. Strains of both varieties differed considerably in plant characteristics, but such differences were not consistent between the two varieties. Differences

among strains of Stone were as great as those between Stone and Greater Baltimore.

Fruits of Greater Baltimore were rather broad oblate, smooth, fairly regular and uniform, deep red, evenly colored, free from cracking but quite subject to blossom-end rot, with outer and inner walls of medium thickness, and with large, distinct locules which contained a fairly large number of seeds. Fruits of Stone were deeper oblate, but differed in size among the different strains. Plants were generally large, somewhat spreading, with rather coarse, dense foliage which was fairly susceptible to leaf-spot diseases.

The strains of Greater Baltimore tested were Greater Baltimore Certified (Landreth), Greater Baltimore (Stokes) and Indiana Baltimore T47.4M (Assoc. Seed Gro.). All were quite similar in fruit characteristics and in appearance of plants, though the last named strain seemed a little less damaged by leaf-spot. Stone Certified (Landreth), Stone (Ferry-Morse), Clark Special "C" N45.1M (Assoc. Seed Gro.), and The Burpee 1099 (Burpee) were large-fruited varieties of the Stone type, while Red Rock Certified (Landreth), Norton Certified (Landreth), Delaware Beauty, and Success 600 (Harris) were of the smaller-fruited type. Early Stone 602 (Harris) was distinctly earlier than typical Stone and had a smaller plant, but was typical in fruit characteristics. King of All (Schell) was quite similar to the typical Greater Baltimore strains, as was Asgrow 100 (Assoc. Seed Gro.) in fruit, though the latter had a more vigorous and healthy plant. Matchum (C. E. Myers) resembled Stone in appearance of foliage, but the fruits were more nearly globular, the plant was much more erect and compact, and the foliage was considerably less damaged by leaf-spot—in fact, this variety was among the strains least damaged by these diseases. Early Detroit (Ferry-Morse) was similar to Stone in fruit form and plant characteristics, but was purple-red in color.

Tangerine (Burpee) was a very large-fruited, late yellow variety. No. 401, U40.1M (Assoc. Seed Gro.), introduced during the present season as Asgrow Scarlet Dawn, produced fruits which were similar to those of Marglobe, in being smooth, globular, thick-walled, and firm. It matured during the same part of the season as did Bonny Best strains, and was quite productive.